AMENDMENTS TO THE SPECIFICATION

Please substitute the following replacement paragraph(s) for the previously-pending versions of such paragraph(s). The replacement paragraph(s) are marked-up to show changes from the previously-pending versions thereof. Please add the following new paragraph(s) as indicated.

Replace the paragraph at page 1, lines 4-5 with the following replacement paragraph:

This application is a continuation of U.S. Patent No. 6,627,571, issued on September 30, 2003~~copending application number 09/516,669 filed March 1, 2000~~, incorporated herein by reference.

Replace the paragraph at page 2, lines 19-32 with the following replacement paragraph:

Solution-based methods, such as the sol-gel process, are widely used for the synthesis of inorganic materials. An example of one system for the formation of combinatorial libraries is disclosed in PCT Application Serial No. WO/17413, based on commonly owned ~~co-pending~~ United States patent application Serial No. 09/156,827, now abandoned, entitled "Formation of Combinatorial Arrays of Materials using Solution-Based Methodologies", hereby expressly incorporated by reference. See also, WO 98/15969, hereby incorporated by reference. Also, of potential interest to the present invention are U.S. Patent No. 5,959,297 "Mass Spectrometers and Methods for Rapid Screening of Libraries of Different Materials", U.S. Patent No. 5,585,136, "Method for Producing Thick Ceramic Films by a Sol Gel Coating Process", PCT Application Serial No. WO 00/51720, based on U.S. Patent Application, Serial No. 60/122,704, now abandoned, entitled "Chemical Processing Microsystems, Diffusion-Mixed Microreactors and Methods for Preparing and Using Same", and Choi et al., "Combinatorial Methods for the Synthesis of Aluminophosphate Molecular Sieves," Angew. Chem. Int. Ed. 1999, 38, No. 19 (2891-2894), each of which are hereby incorporated by reference.

Replace the paragraph at page 7, line 21 – page 8, line 15, with the following replacement paragraph:

In general, the method and system of the present invention contemplates forming an array of materials, and includes impregnating a catalyst carrier on a substrate with a catalyst precursor. The array of materials can be an array of supported catalyst materials or catalyst candidate materials to be screened for catalytic activity, selectivity, conversion, and/or yield with respect to one or more reactions of interest. Hence, in one particularly preferred embodiment, the method and system of the present invention is employed to discover improved inorganic solids, and more particularly, to discover improved catalysts. To use this invention to discover catalysts, in one embodiment, arrays of catalyst materials can be prepared from support components (and/or precursors thereof) and catalytic components (and/or precursors thereof) by automated deposition techniques, and particularly automated liquid dispensing techniques. The array of supported catalyst materials or catalyst candidate materials are preferably formed *in situ* on the substrate. Advantageously, where the substrate is or can be adapted for use in connection with a catlytic screening system, the *in situ* preparation of the supported materials allows for an efficient workflow. Specifically, libraries of combinatorial materials can be prepared as described herein, and subsequently screened while resident on the substrate – preferably without having to further transfer off of the substrate or otherwise handle the materials on an individual basis. Further aspects of combinatorial materials science research are disclosed in references cited herein. *See*, generally for example, PCT Application Serial No. WO/17413, based on U.S. Patent Application Serial No. 09/156,827, now abandoned, hereby incorporated by reference, entitled "Formation of Combinatorial Arrays of Materials Using Solution-Based Methodologies." As such, this invention provides useful methods for a combinatorial materials science research program for the discovery of novel catalysts. Catalyst materials of the invention can be prepared using rapid-serial or parallel synthesis methods, analyzed *in situ* during a chemical reaction of interest, and directly evaluated for catalytic performance.

Replace the paragraph at page 15, lines 19-28 with the following replacement paragraph:

Dispensing or delivery of the components to the regions can be accomplished in any one of a number of manual or automated methods. One preferred method and system for generating a combinatorial library involves the employment of automated systems driven by suitable software, such as LIBRARY STUDIO™, by Symyx Technologies, Inc. (Santa Clara, California); IMPRESSIONIST™, by Symyx Technologies, Inc. (Santa Clara, California); or a combination thereof. The skilled artisan will appreciate that these systems can be adapted for use in the present invention, taking into account the disclosures set forth in commonly-owned copending U.S. Patent Application, Serial Nos. 09/174,856 and U.S. Patent No. 6,507,945~~09/305,830~~, each of which is hereby incorporated by reference.

Replace the paragraph at page 16, line 23 – page 17, line 7 with the following replacement paragraph:

Using the dispenser systems discussed in commonly owned ~~and copending~~ U.S. Patent No. 5,985,356~~patent application 08/327,513~~, previously incorporated by reference, the individual components or component mixtures can be delivered separately to regions on the substrate either sequentially or simultaneously. In a presently preferred embodiment, the components or component mixtures are sequentially delivered to either a single predefined region on the substrate or, alternatively, to multiple predefined regions on the substrate. For example, using dispenser having two nozzles, one or more first components can be delivered to regions on the substrate. Alternatively, using this same dispenser, a component can be simultaneously delivered to two different regions on the substrate. In this instance, the same component or, alternatively, two different components can be delivered. If the same component is delivered to both of the regions, it can be delivered at either the same or different concentrations. Similarly, using an dispenser having eight or more nozzles, for example, eight or more different components can be simultaneously delivered to a single region on the substrate or, alternatively, eight or more components (either the same or different) can be simultaneously delivered to eight or more different regions on the substrate.

Replace the paragraph at page 21, lines 14-23 with the following replacement paragraph:

Examples of ratios and techniques for forming a variety of arrays are illustrated in PCT Application Serial No. WO/17413, based on U.S. Patent Application, Serial No. 09/156,857, now abandoned, entitled "Formation of Combinatorial Arrays of Materials Using Solution-Based Methodologies," hereby incorporated by reference. Preferably an array is created having at least 3 different materials, more preferably at least 5, still more preferably at least 10. Amounts of different materials in excess of 10 are contemplated for a single array in accordance with the present invention. For instance, arrays may contain at least 12, 24, 36, 48, 96, 256, 500, 1000, 10^5, or 10^6 different materials. In some embodiments, the array can include 96xN different materials, where N ranges from 1 to about 20, and preferably from 1 to about 10 or from 1 to about 5.

Replace the paragraph at page 23, line 19 – page 24, line 3 with the following replacement paragraph:

By way of example, X-ray diffraction (XRD) and X-ray fluorescence (XRF) can be used to determine the material crystal structure and composition, respectively. Libraries of materials prepared can be screened. For instance, libraries of potential catalysts are screened for the reaction of interest using, for example a scanning mass spectrometer, as disclosed in commonly owned ~~copending~~ U.S. Patent No. 5,959,297~~patent application no. 08/946,730, filed October 8, 1997~~, which is incorporated herein by reference. Catalysts may also be screened for the reaction of interest using, for example a scanning photothermal deflection spectrometer, as disclosed in commonly owned ~~copending~~ U.S. Patent No. 6,087,181~~patent application no. 09/039,991, filed March 16, 1998~~, which is incorporated herein by reference. A parallel microreactor can likewise be used to screen the array of catalysts, such as is disclosed in commonly owned PCT Application Serial No. WO 00/51720, based on ~~copending patent application~~ U.S. Serial No. 60/122,704, now abandoned, noted above. Another catalyst screening method uses a fixed bed parallel reactor, as disclosed in commonly owned ~~copending~~ U.S. ~~patent application no. 09/093,870~~ Patent No. 6,149,882, ~~filed June 9, 1998,~~ which is incorporated herein by reference.

Of course, other useful screening methods may be employed, and the present invention is not confined merely to the use of the above screening methods.

Replace the paragraph at page 28, lines 8-30 with the following replacement paragraph:

In one method, the substrate is prepared for receiving the mixture of components by starting with a flat silicon substrate and chemically modifying it using organosilane reagents, such as $CH_3(CH_2)_nSiCl_3$ where $0 \geq\leq n \geq\leq 17$. The organosilane reagent is chosen to lend particular wetting characteristics to the substrate surface. Typically, the substrate is sonicated for about 15-20 minutes in isopropanol or another alcohol or with other times and solvents to clean the substrate. The substrate is then rinsed with distilled and de-ionized water, dried under a nitrogen gas jet and heated at 120°C for about 20-30 minutes. The exact conditions for this cleaning and drying can vary depending on the exact silane chosen as well as the substrate chosen. After cooling, the substrate is placed in a 5%v/v solution of the silane in a solvent (such as dichloromethane), then removed from the solvent, washed (for example with methanol), and then dried under a nitrogen gas jet. This entire process can be repeated one or more times. The silane used to modify the surface is chosen to affect the wetting properties of the substrate appropriate for the common solvent employed to ensure isolation of the regions on the substrate, thereby encouraging the mixture of components to remain in the regions. After the substrate is chemically modified through silanization, an array of regions is created by bead blasting through a patterned mask with grit. A preferred grit is 50 μm alumina grit. The array of dimples takes the pattern of the mask. In a preferred pattern, a plurality of round 3 mm diameter regions is constructed on the substrate using a stainless steel mask with sufficient spacing so that the materials do not intermix, e.g., about 2 to about 4 mm. Once the substrate is prepared, solutions of the starting components are deposited in the individual regions on the substrate.

Replace the paragraph at page 31, lines 19-30 with the following replacement paragraph:

Nitrate solutions of Ni, Pd, and Pt are mixed in a microtitre plate using a CAVRO robot to form a 16 x 16 array of solutions with varying concentrations of the three metals. Using

automated liquid dispensing a 250 nL portion of each solution is impregnated into the carrier in a unique predefined region of the quartz wafer. The wafer is then calcined at 120 °C for 2 h, at 180 °C for 2 h, and at 380 °C for 4 h. The array of catalysts are then screened for an amination reaction using a reactor, such as that disclosed in U.S. Patent No. 5,959,297 (Weinberg et al; September 28, 1999), hereby incorporated by reference, and PCT Application Serial No. WO 00/51720, based on U.S. Patent Application Serial No. 60/122,704, now abandoned. Alternative screening techniques may be employed such as, without limitation, a scanning mass spectrometer type reactor or a parallel flow reactor coupled to a suitable detector system. See U.S. Patent ~~Application Serial~~ No. 5,959,297 hereby incorporated by reference.

Replace the paragraph at page 33, lines 28-30 with the following replacement paragraph:

Upon removal from the furnace the resulting material is screened for catalytic activity using mass-spectrometry techniques such as disclosed in U.S. Patent ~~Application Serial~~ No. 5,959,297 hereby incorporated by reference.

Replace the paragraph at page 34, lines 9-14 with the following replacement paragraph:

Upon drying, a second substrate is provided. The second substrate is generally a good high temperature material, such as stainless steel. That is, it~~is~~ can be used for heat treating at temperatures above about 150 degrees C without significant distortion or degradation. The second substrate has a well pattern defined therein having a substantial mirror image to the pattern of the first substrate. Within each well, there is placed a removable container or cell (e.g., a capsule).

[NO FURTHER AMENDMENTS THIS PAGE]